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Vol. 28, No. 2 February, 1947

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Should I Buy A Citrus Grove?

ZACK SAVAGE
Associate Agricultural Economist

Entering any business enterprise as another means of making profits is not so serious a matter as entering that business as a sole means of support. But anyone who enters citrus production by investing all his assets in a grove, must realize a profit from it. If only partial payment is made for the grove with a mortgage for the balance, the situation is still more serious in that additional income must be had for interest on the loan and to amortize the debt.

During recent months there have been many groves sold at prices as high as $2,500 per acre, with some offers of this amount being refused. To purchase a grove at such a price by paying 25 percent, or even 50 percent, cash would place the purchaser in a bad financial position in the event of a drastic drop in grove prices. It has not been many years since it was the exception for a grove to sell as high as $1,000 per acre. For such a grove to sell at $2,500 now would mean that if purchased 50 percent for cash the purchaser would still owe more on his mortgage than the full price of the grove a few years ago.

It might be well to consider the earning power of citrus groves over the past few years as an indication of what might be expected in the future in the way of returns for a livelihood and debt payment. During the 1944-45 season the Agricultural Extension Service, through cooperation of citrus growers, obtained costs and returns on 221 groves. The average age of these groves was 23 years, and no groves with average ages under 11 years were used in this group. These groves had returns from fruit of $445 per acre that season.

The returns for the 1945-46 season have not all been received, but the production cost was $138 per acre, which is $20 more than for 1944-45. No doubt the 1946-47 costs will be still higher, which is justification for using the latest cost figures for this computation, Using the latest figures on production costs and on fruit returns would leave a net of $317 per acre, which would contribute well towards living costs, interest on debt, and debt payment. But the one season of 1943-44 is the only season with a higher net returns figure than $317 per acre within the history of [illegible], which extends back to 1931.

If a grove with this production and return record had been purchased at the beginning of the season at $2,500 per acre with 25 percent of purchase price paid in cash, interest on the balance of $1,875 per acre at 4 percent would amount to $75, plus a payment on a 20-year mortgage of $94, would leave $148 per acre for living and for producing the following crop. As there is little likelihood of production costs being drastically reduced very quickly, reserving $138 for the next season would leave $10 per acre for the operator to live on

(Continued on page 10)

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Quality In Citrus Fruits

Introduction

The importance of citrus fruits in the diet of the nation is indicated by the rapid growth of the citrus industry. During the decade from 1935 to 1945 production of oranges in the United States increased from 52 million boxes to 105 million boxes and of grapefruit from 18 million to 63 million boxes. This tremendous rise in production has been accompanied by an ever-increasing demand for citrus fruits by consumers, from 39 pounds per capita in 1934 to 68 pounds in 1944. Rapid transportation to marketing centers, usually under refrigeration, has contributed to the increasingly wider use of citrus by the consuming public. The many improvements made in handling methods that have resulted in a better retention of vitamins, and the development of higher quality in processed and canned products have also been factors.

Orange and grapefruit juices are important in the diet since they are foods in which the alkaline element ultimately predominates. This is of interest because citrus juice contains organic acids, chiefly citric acid. But the juice is also rich in mineral salts which are predominately alkaline. The organic acids are destroyed in the process of digestion, so that the final effect of the juice is determined by its mineral content.

It is important that all possible information bearing on those factors that make for higher quality in citrus fruits should be identified and evaluated. With this objective, investigations have been made on oranges, grapefruit, tangerines, and Temple oranges at the U. S. Department of Agriculture Horticultural Field Laboratory, Orlando, Florida.

These investigations have included detailed observations and measurments of the physical characteristics and also analyses of the chemical constituents of the principal varieties of fruit at definite intervals, beginning with immature fruit and continuing until the fruit was fully mature and ripe. The changes that occurred, step by step, were determined; and of more importance, methods for evaluation and establishing definite standards for comparison of these changes were devised.

The ripening process of oranges and grapefruit can take place only while the fruits are attached to the tree. It is therefore obvious that these fruits should not be harvested until they are mature and hence ripe. The following definitions are given in order to avoid possible confusion as to the meaning of the terms "maturity" and "ripening" as they are used here. **Maturity** refers to the stage of development of the fruit; **ripening** refers to the process by which a mature fruit becomes edible. A mature fruit is one that has attained such a stage of development that it will ripen with acceptable eating quality. Fruits with starch reserves, such as apples and pears, may be mature at harvest time, but many varieties do not become ripe and edible until sometime later, when they attain their soft, juicy, aromatic qualities. In contrast, oranges and grapefruit do not improve in their eating quality after harvest and owe their sweetness to the natural sugar contained when they are picked; they contain practically no starch and do not undergo such marked change in composition as do apples, pears, or bananas after being picked from the tree. Since the ripening processes in oranges and grapefruit occur only while they are on the tree, it can be readily understood that they should not be harvested until they are mature and hence of acceptable quality. Instead of improving in their eating quality after harvest, these fruits tend to lose quality, the rate of loss being correlated

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Seasonal Changes in Relation to Consumer Acceptance of Oranges, Grapefruit, Temple Oranges, and Tangerines 1/.

1/ By Paul L. Harding, horticulturist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture. Presented for Publication in the Proceedings of the American Society for Horticultural Science of the meeting held at Boston in December, 1946.

with the temperature at which they are held.

In storage studies made on Florida oranges the rate of respiration was determined at temperatures from 32° to 110° F. The material used up in respiration was ascertained from these data. At 32° F. Sugar was broken down or "respired"; but at 50° to 70° more acid than sugar was used up, or if the sugar was incompletely oxidized, intermediate products such as ethylene or alcohol were formed. At 90° and above the C02 ratios indicated that considerable intramolecular respiration was taking place (that is, that the fruit was breaking down its own tissues to obtain required oxygen).

Material And Methods

The data presented in this article were obtained between 1935 and 1946, and these investigations are still in progress. Each type of citrus fruit usually was studied during four consecutive years. The experimental plots were located in several different commercial groves. Variety, rootstock, and soil type determined the selection and location of the plots. Samples were collected from all of the groves at intervals of 2 or 4 weeks, beginning about September 1 and continuing through the season until the fruit was overripe. This long period of sampling provided information on the changes in physical characters and chemical constituents of the fruit during the various stages of maturity and ripening. Differences among groves, as well as those occurring from year to year, were thus determined. The detailed information is presented alsewhere (1), (2), (3), (4), (5).

Market quality is associated with appearance, firmness, freedom from blemishes, thickness and texture of rind, whereas eating quality is influenced by the texture of flesh, juiciness, content of total solids (principally sugars,) total acid (citric), ratio of solids to acid, aromatic constituents, vitamins, and mineral content.

The eating quality of the fruit was determined soon after picking. In each test 30 to 50 or more fruits were used. The fruits were cut transversely and from each half was cut a wedge-shaped piece for tasting. The judging panel was made up of staff members of the Orlando station, and each judge was asked to taste several pieces before rating a sample according to the arbitrary scale. By use of this scale the fruit could be classified as very acid, acid, tart, pleasantly tart to sweet, or insipid. At the beginning of each season the arbitrary standard scale to be used and the method of evaluating internal quality were discussed. At that time it was pointed out that a score of 70 would be the minimum standard of acceptability, whereas good to excellent quality would be rated from 70 to 100. The scale also permitted the scoring of immature fruit (values 20 to 69) and of insipid fruit (values 50 to 100); but it was understood that any rated below 70 would not meet consumer approval and the sweet but insipid fruit would be so designated to differentiate it from better-quality fruit having a similar numerical rating. The judges were believed to represent fairly well the prospective consumers. Tasters showed differences in scoring but not large ones, and the numerical average thus obtained from 20 to 45 judges appears to be a satisfactory method of measuring quality.

Flavor as determined by taste is closely correlated with seasonal changes in weight and texture of the fruit, the color of its flesh, the percentage of the fruit that is juice, and the ratio of total solids to total acidity. These improve or increase with the maturity of the fruit. By recording the picking dates and plotting the total solids

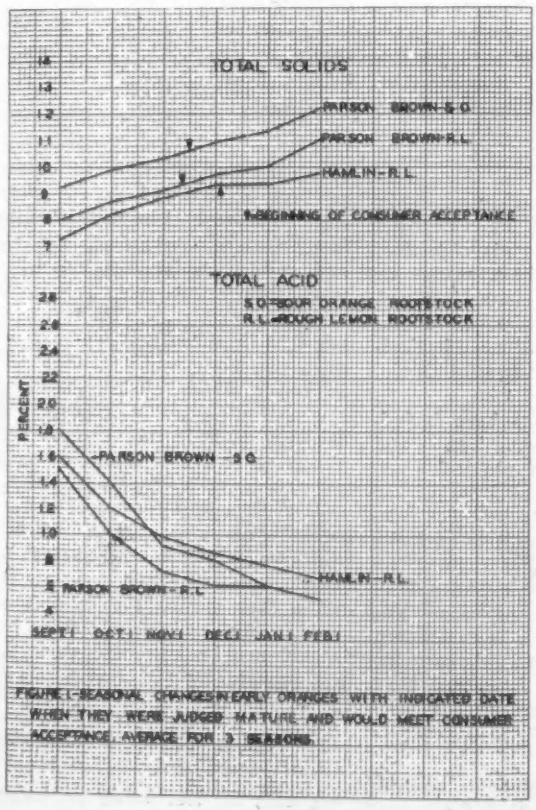

FIGURE 1-SEASONAL CHANGES IN EARLY ORANGES WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE. AVERAGE FOR 3 SEASONS.

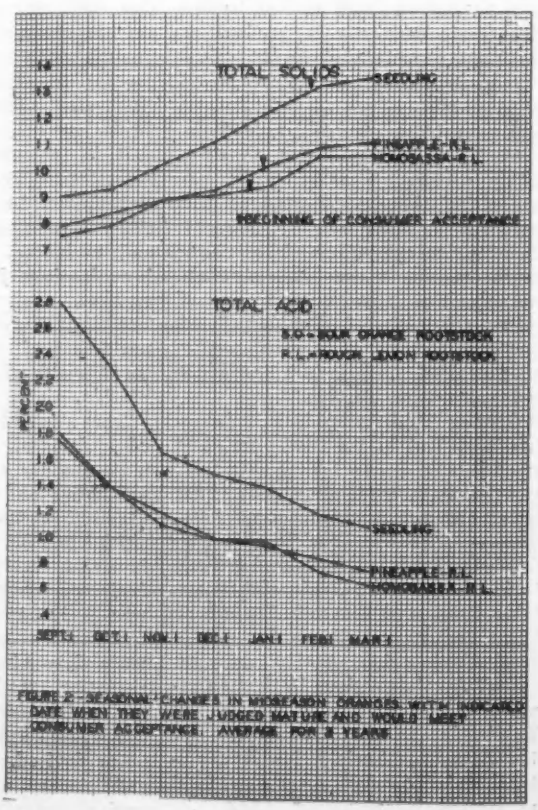

FIGURE 2- SEASONAL CHANGES IN MIDSEASON ORANGES WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE. AVERAGE FOR 3 YEARS.

and the total acid in nomograph form (a special chart showing the relation of more than 2 factors), it was possible to show the relation of these two factors to each other in fruit at its earliest stages of consumer acceptance, as judged by its flavor, and eventually to determine a minimum standard of acceptability for the different varieties.

An effort was made to give an over-all picture of the quality of oranges, grapefruit, Temples and tangerines that might be expected on the market at different times. The average values presented for total solids, total acid, and palatability (consumer acceptance) were obtained by averaging the results obtained at each picking period. The results should be regarded as approximate since they are based on average rather than minimum values. These findings are shown in figures 1 to 7.

Results

Seasonal changes in early oranges. Tests were made on several varieties of early oranges; however, in this article only the Hamlin and Parson Brown of the early varieties will be discussed. It will be noted in figure 1 that during the development and ripening of the fruits total solids increased, while total acidity decreased. Also figure 1 it may be noted that Hamlin oranges contained lower amounts of solids and greater acidity than Parson Brown fruits.

Rough lemon and sour orange rootstocks affected the composition of Parson Brown oranges. On rough lemon they contained a lower percentage of solids and acid than on sour orange.

Parson Browns ripened earlier than Hamlins. They were judged to be of acceptable quality about November 11. At this date those on rough lemon contained 9.35 percent solids, 0.66 percent acid, and the ratio of total solids to acid was 14.17 to 1. In comparison, Parson Brown oranges on sour orange rootstock were considered to meet consumer acceptance November 15 and contained 10.60 percent solids, 0.85 percent acid, and the ratio was 12.47 to 1. Hamlin oranges on rough lemon were acceptable December 3, when they contained 9.30 percent solids, 0.85 percent acid, and ratio was 10.94 to 1.

Seasonal changes in midseason oranges. The trends of solids and of acid in midseason oranges were similar to those of the early varieties in that during ripening solids increased and acidity decreased (see figure 2). Only small differences existed between the Pineapple and Homosassa varieties but the former contained slightly more solids. Florida Seedlings differed greatly from the two named varieties since they contained very significantly greater amounts of both solids and acid.

The three midseason kinds were rated as acceptable between December 20 and January 25. To be specific, Homosassa oranges were of acceptable quality about December 20 when they contained 9.32 percent solids, 0.98 percent acid, and the total solids to acid ratio was 9.51 to 1. Pineapple oranges were acceptable December 23 when they contained 10.12 percent solids, 0.94 percent acid, and the ratio was 10.85 to 1. Seedling oranges met consumer acceptance January 25 when they contained 13.07 percent solids, 1.22 percent acid, and the ratio was 10.71 to 1.

Seasonal changes in late oranges. Studies were made to determine the influence of rootstocks on the composition of Valencia oranges. The various plots were in the same grove and consisted of Valencias on rough lemon, sour orange, grapefruit, sweet orange, and Cleopatra rootstock. Tests were made during three seasons on the Valencias from the plots on rough

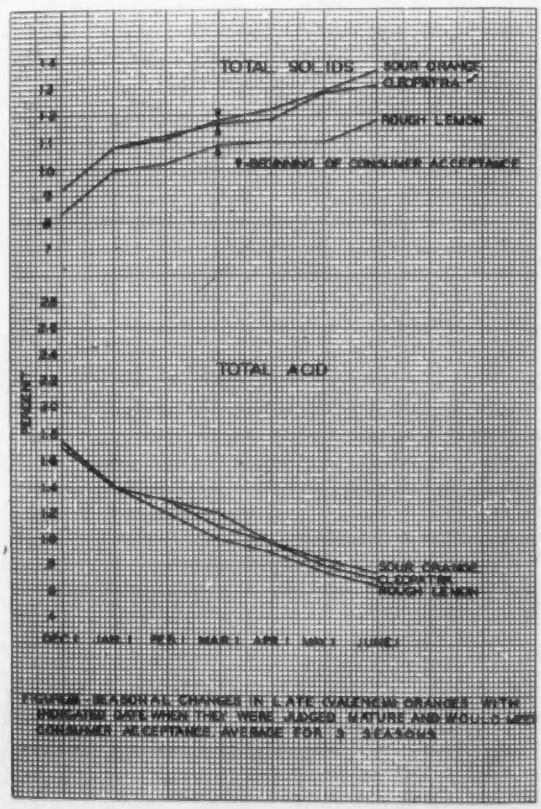

FIGURE 3-SEASONAL CHANGES IN LATE VALENCIA ORANGES WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE. AVERAGE FOR 3 SEASONS.

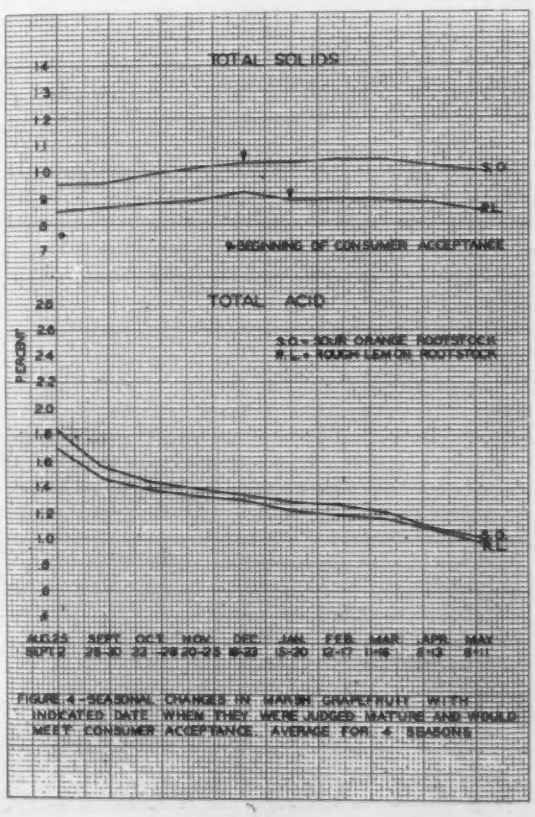
TOTAL SOLIDS
BEGINNING OF CONSUMER ACCEPTANCE
TOTAL ACID
S.O.= SOUR ORANGE ROOTSTOCK
R.L.= ROUGH LEMON ROOTSTOCK
PERCENT
AUG. 25 SEPT. 2 SEPT. 25-30 OCT. 23 NOV. 28 DEC. 20-25 JAN. 8-20 FEB. 12-17 MAR. 1-15 APR. 2-13 MAY 8-11

FIGURE 4-SEASONAL CHANGES IN MARSH GRAPEFRUIT WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE. AVERAGE FOR 4 SEASONS.

lemon, sour orange, and Cleopatra, whereas the fruits from the other two plots were tested during two seasons. Seasonal variations were found and these affected some of the averages, especially those made for two seasons only.

The data presented graphically in figure 3 show that the Valencias on sour orange and on Cleopatra rootstocks contained a greater percentage of total solids and acid than did those on rough lemon. The total solids produced on grapefruit and on sweet orange were similar to the findings for the Cleopatra rootstock, ranging near those of the sour orange, all being significantly higher than in the case of Valencias on rough lemon stock.

As they ripened the Valencia oranges on all the various rootstocks became less acid. Fruits from the trees on sour orange rootstocks contained the most acid, followed by those from sweet orange, Cleopatra, rough lemon, and grapefruit.

The Valencias on grapefruit rootstock ripened first, being rated acceptable on February 20. At that date they contained 11.07 percent solids, 1.07 percent acidity, and the solids-to-acid ratio was 10.35 to 1. The Valencias on the other four stocks were of acceptable quality about March 1. Those on rough lemon contained 10.90 percent solids, 1.00 percent acid, and the ratio was 10.90 to 1. On sour orange the solids content was 11.80 percent, acid 1.20 percent, and the ratio was 9.83 to 1. Valencias on sweet orange contained 12.00 percent solids, 1.00 percent acid, and the ratio was 12.00 to 1. The Valencia fruits on Cleopatra stock contained 11.70 percent solids, 1.10 percent acid, and the ratio was 10.64 to 1.

Seasonal changes in grapefruit. Investigations were conducted on Marsh and Duncan grapefruit varieties during four seasons. The studies included changes in composition of the fruits, as affected by variety and rootstocks. Figures 4 and 5 indicate that the changes in total solids and in total acid are more gradual than was the case in oranges. The greatest change appeared early in the season in immature fruit. Total solids content was generally highest when the grapefruit was in prime eating condition, with slightly lower solids earlier in the season in immature fruit and also late in the season in very ripe fruit. The Marsh and Duncan fruits on sour orange rootstock contained a greater amount of total solids than did those on rough lemon. Comparisons between varieties on the same kind of rootstock showed that the Duncan contained higher solids than the Marsh. While there was a downward trend in total acid in both Marsh and Duncan as they ripened, the Duncan was consistently higher in acid than the Marsh. Although acid was influenced more by variety than by rootstock, the fruit on sour orange was rather consistently higher in acidity than on rough lemon.

Scores for eating quality showed that both Marsh and Duncan were of acceptable eating quality between December 15 and January 15. Marsh fruits on sour orange were acceptable December 18, when they contained 10.32 percent solids, 1.33 percent acid, and the ratio was 7.77 to 1. Duncan fruits met consumer acceptance December 18. Those on rough lemon contained 10.04 percent solids, 1.45 percent acid, and the ratio was 6.92 to 1; while Duncan on sour orange contained 11.33 percent solids, 1.65 percent acid, and the ratio was 6.87 to 1. Marsh fruits on rough lemon were not of acceptable eating quality until January 15 when they contained 8.91 percent solids, 1.22 percent acid, and the ratio was 7.30 to 1.

Seasonal changes in the Temple

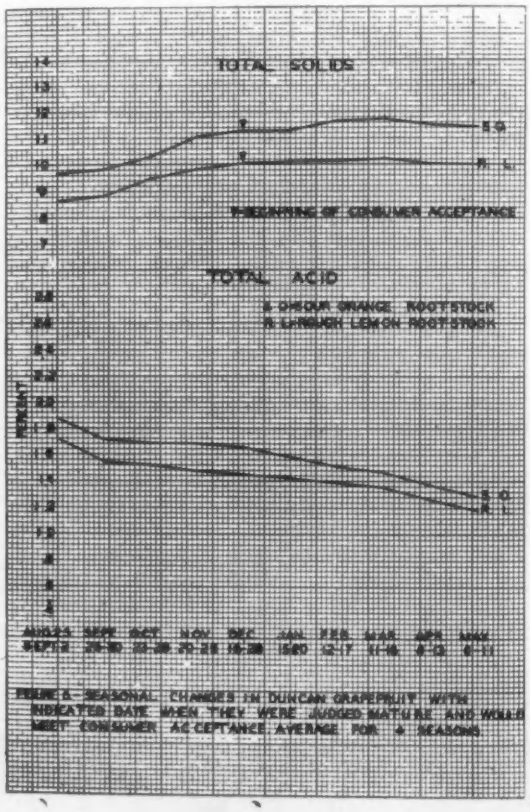

FIGURE 4.—SEASONAL CHANGES IN DUNCAN GRAPEFRUIT WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE AVERAGE FOR 4 SEASONS.

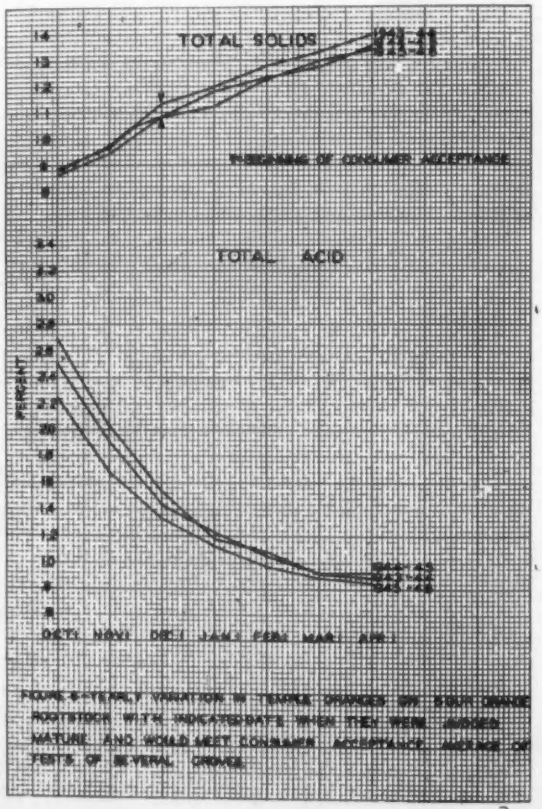

FIGURE 5.—YEARLY VARIATION IN TEMPLE ORANGES ON SOUR ORANGE ROOTSTOCK WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE. AVERAGE OF TESTS OF SEVERAL GROVES.

orange. The Temple orange is notable for its fine eating quality. The fruits contain high total solids and high total acid and are also unique in containing aromatic constituents which impart to flesh and juice an unusually desirable bouquet.

The study on the Temple orange is still in progress, and the information presented herein should thus be regarded as only tentative. Space does not permit a full discussion of all the data accumplated to date; therefore, this article deals only with the compositional changes in the Temple fruits on sour orange rootstock, which is the principal one used for this variety.

Figure 6 shows the content of total solids and of total acid in Temple oranges during three seasons, 1943-44, 1944-45, and 1945-46. The fruits contained slightly higher solids and acid during 1943-44 than during the season 1945-46, but the yearly variations were not great.

According to the averages obtained through the taste tests, the Temple was of acceptable eating quality by December 1 of each year. On that date, in 1943, the fruits contained 11.03 percent total solids, 1.53 percent total acid, and the ratio of total solids to acid was 7.21 to 1. In 1944 the ripe fruits contained 10.82 percent solids, 1.43 percent acid, and the ratio was 7:57 to 1; while in 1945 fruit which met consumer acceptance contained 10.82 percent solids, 1.33 percent acid, and the ratio was 8.14 to 1.

Seasonal changes in tangerines. The study of tangerines is also still in progress, and the information here presented should also be regarded as only tentative. The information given is for the Dancy tangerine on rough lemon rootstock, which is the principal variety and the most commonly used rootstock for tangerines.

Yearly variations for tangerines are shown in figure 7. It will be seen that there was considerable difference from year to year. The highest amounts of both total solids and total acid were found during the season of 1943-44, and the smallest amount during 1945-46.

Tangerines in 1943 were first rated of acceptable quality about December 1 when they contained 10.96 percent solids, 1.12 percent acid, and the ratio of solids to acid was 9.79 to 1. In 1944 tangerines were acceptable November 15 when they contained 9.92 percent solids, 0.89 percent acid, and ratio was 11.15 to 1. The fruits met consumer acceptance November 15, 1945, and then contained 8.95 percent solids, 0.70 percent acid, and the solids to acid ratio was 12.80 to 1.

Summary

The fruit quality standards arrived at in these investigations resulted from the data obtained through chemical analyses and taste testing by a panel of taste judges.

A statistical study was made of some of the taste ratings of individual judges. It was found that although differences existed among tasters, they were not large. There was a definite association between palatability ratings and some of the more exact measurements, such as total solids and total acid. Thus the statistical studies indicated that the palatability ratings were quite satisfactory to measure quality.

An over-all picture has been presented of the progress of ripening changes in oranges, grapefruit, Temples, and tangerines, and of the quality that might be expected on the market at different times. The general statements given are based on the averaged results of repeated tests.

The standards of consumer acceptance which were set up by the panel do not agree very closely with the standards in the present maturity laws. The taste judges demanded sweeter and more mature fruit, or, in other words, fruit containing higher ratios of total solids to total acid than that which would pass State maturity requirements. The differences between the standards established through the testing panel and by the maturity laws were greater for oranges and tangerines than for grapefruit.

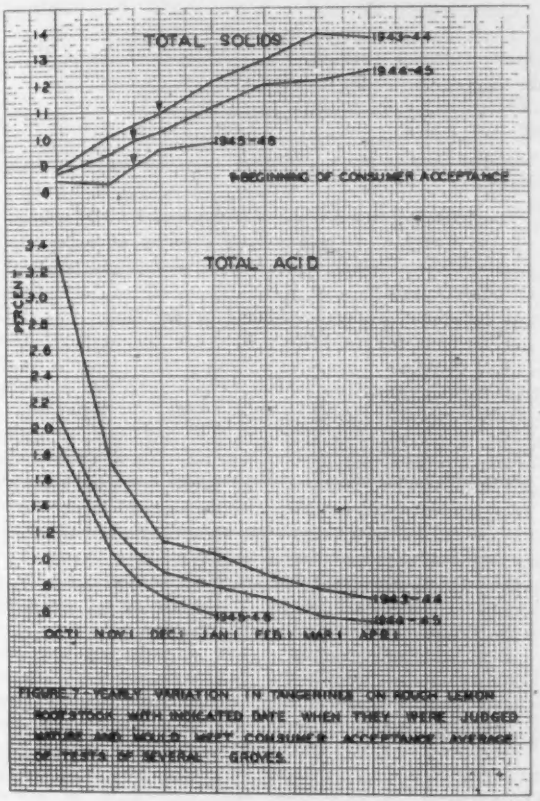

FIGURE 7.—EARLY VARIATION IN TANGERINES ON ROUGH LEMON ROOTSTOCK WITH INDICATED DATE WHEN THEY WERE JUDGED MATURE AND WOULD MEET CONSUMER ACCEPTANCE. AVERAGE OF TESTS OF SEVERAL GROVES.

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(Continued on page 20)

SHOULD I BUY A CITRUS GROVE?

(Continued from page 3)

during the coming year.

This rate of net returns would require a large acreage to furnish money on which a family could live, In the event the grove had been contracted for after the crop of fruit was made and before picking, then after reserving $138 for producing the following crop the owner would have $148 per acre left as living expenses. for the year, and on the basis of the above purchase agreement, would be valued at $50,000, $14,380 of which would be paid by the end of the first year with $35,620 still owed in the form of a mortgage.

The above figures are based on unusually good returns. Since average figures on 221 groves for one season have been used it would be well to apply the returns realized from an average of 212 groves for the ten-year pre-war period of 1931-41. The average returns from fruit were $97 with an average cost of production of $57, which left a net of $40 per acre. History may not reepat itself to the extent that the average net returns for ten years will be that low, and the chances are that they will go considerably lower than at present. This net of $40 per acre would make an interest payment at 4 percent and a principal payment on a twenty-year loan amounting to only $444 per acre with nothing left for making the next crop nor any contribution to living expenses.

A Valencia-grapefruit grove on which the Extension Service has records for the past twelve years was sold recently. This grove is not one of the best groves included in these records, nor is it one of the poorest. Its average age at the time of the sale was 27 years, and 41 percent of the trees are grapefruit. The price at which the grove was sold is not known by the writer, but an examination of its past record reveals that it is not worth a very high price. It has paid unusually well for the past two seasons, when 48 percent of the returns from fruit and 62 percent of the net returns for the past twelve seasons were received.

Stated another way, total receipts from fruit for the past two seasons were 91 percent of the total receipts for the ten seasons prior to that time, and the net receipts were one and two-thirds times that of the total for the ten previous seasons. Receipts from fruit for these ten seasons, 1933-43, averaged $159 per acre. Production costs were $93 for this period, leaving a net of $66 per acre. This net figure would pay 4 percent interest and principal payment on a twenty-year loan on a debt of only $730 per acre. If the purchaser bought this grove at $1,000 per acre and paid 27 percent in cash, this rate of income would service the debt and pay production costs, but would contribute nothing towards living expenses.

Average figures for the twelve-year period changes the picture considerably. The rare combination of good yields and good prices for the past four seasons has contributed much to the increases in grove prices. Groves that have not paid production costs during this period are very poor groves indeed. And if the excellent financial returns of this period could be maintained in the future there would be justification for present prices of most groves. This grove netted an average of $542 per acre for the past two seasons. This rate of income would pay interest and principal payment on a $6,000 debt were it all used for that purpose. Or, it would service a debt of $1,875 per acre and contribute $373 per acre towards living expenses. If this rate of net income could be maintained, this grove would be a good buy at $2,500 per acre.

Another grove sold about a year ago on which the Extension Service has records for the four previous seasons, 1940-44. Both returns from fruit and the net returns amounted to more in the 1943-44 season than the sum of these separate items for the three previous seasons. This is a 12-acre Pineapple-Valencia grove averaging 19 years of age at the time it sold. The net returns averaged $194 for the three seasons of 1940-43. This rate of income, which was during seasons of good yields and fruit prices generally, would service a debt of $700 and contribute $131 per acre or a total of $1,573 from the grove, towards living expenses. Thus a purchase price of $1,000 per acre, paying 30 percent cash, might be justified at this rate of net returns.

For a grove to pay high net returns it must yield well, and the fruit must be sold at a good price. These two favorable factors rarely occur at the same time, but such has been the case during the past four seasons. Therefore, it is not expected that both factors will continue so favorable indefinitely.

Several things might be pointed out that anyone who contemplates buying a citrus grove should consider before purchasing.

1. Learn something—as much as possible—about citrus production and marketing before buying a grove. It might pay well to spend a year or more in the employ of a good caretaker or grower, or several months each in the employ of several different such men.

2. Upon locating a grove that you contemplate purchasing, obtain an accurate tree count by variety, age of tree, and tree condition.

3. Obtain the yield, gross returns, production costs, and net returns each season for the past ten or twelve seasons. By so doing four or five unusually good seasons would be had together with seven or eight seasons which were not so favorable. Study and analyze these records season by season contrasting the averages for the favorable and unfavorable seasons.

4. Correlate the yield with age of trees over the entire period of these records and contemplate increases in yield and grove value if the grove is young in age.

5. Check for unusual soil conditions, dryness of soil, and grove location with reference to cold spots.

6. Obtain irrigation history of grove and if it is decided irrigation facilities are desirable, check availability of such, together with the water supply. The cost of irrigation equipment, the cost of the application of water, and the availability of the labor necessary should not be overlooked.

7. Check with the fruitmen who have been handling fruit from this grove, as to its quality and salableness.

8. If it is contemplated that a caretaker will be employed to do the grove work, check availability, reliability, and desirability of such in the vicinity. Also check the rebate history of cooperative caretakers in comparing rates of caretaker charges.

9. Do not buy a grove at an inflated price. But if you do buy a grove, remember that the best groves usually come nearer being worth inflated prices than the poor groves are. In other words, you will have a better chance of making the best groves pay out than you will poor groves, at present prices.

10. In buying grove property get sufficient acreage to supply ample income to carry the debt load, if any, and to furnish a good living

(Continued on page 20)

Swann Says Citrus Growers Must Organize Or Go Broke...

Tom B. Swann of Winter Haven, who probably knows the citrus situation as well as any man in the state, has issued a statement in which he urges citrus growers and shippers to organize for their own protection. Mr. Swann is chairman of Governor Caldwell's citrus advisory committee and former chairman of the Florida Citrus Commission. Pointing out the serious situation now confronting Florida citrus growers, he calls for an iron-clad organization to control shipments and other features of the industry.

His letter appears below:

There is only one sensible approach to the solution of our citrus problems. There is only one way to surmount what at present appears to be the insurmountable. Organization—full and complete organization. Organization to such an extent that from three to five men have absolute authority in the marketing of our citrus crop, whether it be fresh or canned.

I say this dogmatically and with no reservations whatsoever, after 15 years of trial and error service on about every committee and commission conceived and organized to overcome an existing or imminent emergency, by the most fertile brains of an industry where fertile brains abound.

This certainly is not a new idea and I do not believe there is an experienced citrus man in the state who at one time or another has not expressed it. However, at present there is probably not over one who will agree that such organization is feasible. But my contention is, that if one begins to financially hurt enough he will be guided by intelligent thinking rather than emotional and wishful thinking. And may I add that we have begun to hurt.

Our problem itself may be simply stated. To make available to 90 per cent of consumers in our trade territory—whether processed or fresh—fruit of good eating and keeping quality and of acceptable appearance, in volume to satisfy their maximum demands at a price their earnings will permit them to pay, which will return to the producer a reasonable net return on the replacement value of his capital investment.

Complex Solution

The solution is as complex as the problem is simple. An earnest member of the Citrus Commission thinks high solids will do the job. One of our largest growers and packers thinks it will take volume control. An independent canner thinks cooperative canners are at fault. An uninformed newspaper cries about the horrors of color added. A DeLand attorney brays to the world that the Citrus Commission should be elminated. A veteran of vast experience thinks the beverage field is the green pasture. We have just tried a shipping holiday. Grade and size regulations are now in effect. Returns to the grower are less than the cost of production.

Nearly all of the proposals or complaints prominently mentioned have some merit, except doing away with the Citrus Commission. This of course would be sheer folly until we have something better, and would only be advocated through ignorance or malice. However each proposal has its ramifications and complications. It is comparatively easy to raise the solids requirement but does the comsumer like high solids or does he prefer a bland, rather sweet flavor?

In our mail order business we received many compliments on the taste and texture of seedless oranges (Hamlin) with solids of about nine shipped early in December and complaints on Pineapple oranges with much higher solids due to sourness. What is to happen to the grower who has fruit of a variety never attaining very high solids? Volume control with a great deal of loose fruit in the state, a past performance that does not honestly picture an ever changing industry and a multitude of shippers is not feasible.

Calls Pro-Rating Impractical

I served on the last volume control committee and the shipping quotas requested always greatly exceeded the crop estimate. We tried hard to make volume proration a success but equitable distribution of prorates was not possible then and with more marketing agencies is less so today. The beverage field undoubtedly is virgin territory, but people dealing in bottled drinks are interested in a fixed price for their raw material and generally work on a fixed margin of profit. Who today is in a position to furnish yearly suppiies at a fixed price in line with competition?

Our re-greened Valencias are the finest citrus fruits produced in the world. Color added has been the one great advance made by the industry to indicate externally this inner goodness. A shipping holiday is like building a dam to prevent erosion impounding a lot of water, then breaking the dam. Grade and size regulations will not by themselves do the job because there is at times enough top grade fruit available to break the market. Also remember we have canneries.

Two Paths To Follow

There are two paths that we can follow. One is free competition as we are now experiencing it. This means the survival for a few. It means that 14,000 out of 15,000 growers will go broke and have to seek other employment for food and shelter (you can get along without clothes in Florida). It means that the remaining 1000 will emerge badly bent, hungry and extremely unhappy. However, this course will permit us to retain that feeling of rugged individualism, with which so many of our citrus people are so plentifully endowed. Incidentally this course will contribute immeasurably to a change in our form of government.

The other is the path of organization—call it cooperation if you want— which leads to the door opening upon a reasonable prosperity, fair compensation for hard work and a little happiness.

Organization will permit us to have complete and orderly distribution, to maintain quality, to pay for and cut down Hamlin trees if that is necessary, to do brand instead of commodity advertising, which would perhaps double our advertising efficiency, to control volume, to develop beverage fields,

to make color-added altogether ally, to put juice dispensers in public schools, to handle over production through export, even at a loss if necessary, to materially reduce cost of handling from tree to consumer and to meet any and all problems with a common front as they arise.

The day of the speculative operator is probably about over. Our packing and processing plants will have to become mere manufacturing plants, serving the producer at a fair price based on service rendered. It certainly is not necessary that all be cooperatives. An individual can operate more efficiently than a cooperative due to the lack of necessity for continuous compromise. We must have a completely controlled industry but there is a place for every efficient operator in the state today, and a better and more comfortable place than most of them now occupy.

Reduce Marketing Agencies

The crux of the matter is not necessarily in materially reducing the number of packing and processing plants, but in reducing the number of marketing agencies and to give these agencies complete control even to the extent of elimination of part of the crop.

This is the last country to even pretend to possess a free competitive enterprise. And we just pretend because at the present time we are under the complete domination of labor. And if we blindly go on our deluded way each fighting the other for the ephemeral benefits of an air-filled dollar we will find the ranks of socalled labor filled with our own growers and the end will be completely controlled by Uncle Sam instead of ourselves.

The biggest frontier of all lies ahead. The frontier of continuously providnig every American with his quota of things and opportunities. We have conquered the land and the floods, the droughts and the winds—now the time has come to conquer ignorance and undernourishment and to thus help preserve democracy.

Again I say this idea of organization is certainly not original. It has been proposed and tried many times, and failed of complete achievement. The clearing house gave us an inking of what might be accomplished. But we have never before found ourselves looking into an abyss from all four sides—there has always been a way out other than through cooperation. Now it would take a freeze, a hurricane and a war, all in the same year and then it would only be temporary.

Our two trade groups (United Growers and Shippers and Florida Citrus Producers Trade Association) could in my opinion with enough hard work and enthusiasm organize three or four marketing agencies representing practically every shipper and canner in the state. The next step would be to persuade growers to sign up their fruit with a shipper or canner committed to one of these marketing organizations.

I have an idea that nearly every one of our independent canners would prefer handling fruit directly for producers or their agents on a basis of cost plus a very reasonable return on their capital investment than to try to make a speculative profit under the present chaotic conditions.

The legislature could pass an act authorizing the Florida Citrus Commission to appropriate $250,000 for this purpose. With the help of the Farm Bureau, newspapers, magazines, radio stations and personal contact, organization could be brought about. Federal and state laws now in effect might be used to control any small minority not willing to cooperate.

I promised myself and others who were tired of seeing me around that I would disappear from the public view in the citrus picture. However I am beginning to get hungry and orange juice is not a good meat substitute so I cannot resist one more plea that we help ourselves through intelligent joint effort out of this mess we are in.

Knowing about all of the personalities involved, I realize perhaps better than the average that this is a gigantic undertaking but everything that I have and most of the 15,000 other growers have, is in citrus land and trees. As individuals I believe all of us are willing to do our share but individually the only thing we can do is to delegate authority to a few. The war taught us to accomplish the impossible — let's don't forget the lesson.

VISIT CITRUS STATION

Accompanied by County Agent F. E. Baetzman, 46 Orange County citrus growers recently visited the Citrus Experiment Station at Lake Alfred to inspect research work being done there and to confer with Vice-Director A. F. Camp and other station workers.

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ORLANDO, FLORIDA

Readjustments In Processing And Marketing Citrus Fruits

(Continued from last month)

Summary of Report by Bureau of Agricultural Economics.

Costs of Marketing Fresh Citrus and Means of Reducing Them

An examination of Office of Price Administration Maximum Price Regulation 426, as amended, is useful when estimating typical margins taken during the war period, for estimating typical distribution of the consumer's dollar spent for citrus to the distributing agencies, and for examining the functions performed by those agencies. Sales of California-Arizona oranges through a terminal auction in one of 10 major terminal auction cities, November 16-April 30, during the effective period of the regulation, provides a typical instance. The retail sales price would be approximately $8.24 per 1-2/5 bushel box, distributed as follows: $2.85 or 32.2 percent to grower; $1.20 or 14.5 percent to packer for performing functions of picking, packing, and handling; $0.07 or 0.9 percent to shippers' sales agent for selling; $1.33 or 16.1 percent to intermarket carrier for freight and refrigeration; $0.09 or 1.1 percent to terminal auction, $0.29 or 3.5 percent to carlot receivers, $0.30 or 3.7 percent to secondary jobber, the three of which agencies combine to perform the wholesaling function; and $2.31 or 28.0 percent to retail store (if OPA class 1 or 2) for performing retailing functions.

The cost of handling citrus from tree to car, excluding packers operating profit, now constitutes about 19 percent of all marketing charges, and about 14 percent of the consumer's dollar spent for citrus. Therefore any reductions in handling costs that can be effected will definitely increase the competitive advantages of citrus, particularly if prices decline during the next few years. Comparisons of original data obtained for the latest prewar season, 1940-41, and a representative war season, 1943-44, show that certain costs of handling have increased substantially, notably increase in the percentage of total costs required by these two items. For example, total costs of handling Florida oranges in the standard wrapped box increased from $0.868 to $1.122, an increase of $0.254 or 29.3 percent, between the seasons 1940 and 1943. Of the $0.254 increase, $0.228 occurred in the costs of labor, including picking, wrapping and packing, and in the costs of packing materials. Another illustration of the prominent part played by these two items in total costs is that 36 percent or more of all orange-handling costs during the 1943-44 season was for labor, and from 29 to 38 percent was for shook and other packing materials, chief element of which is labor.

Unless labor costs should decrease in proportion to decreases in wholesale fruit price within the next few years, possibilities of substantial decreases in handling costs may lie mainly in the development of labor-saving machinery. Machine filling of bags is now in practice, and may be further adopted as more machines become available. Distinctly less picking costs will be incurred in those instances where pulling the fruit rather than picking is not impracticable. Chief possibilities for reducing the costs of shook appear to lie in substitutes for the present wooden box, since timber supplies are being rapidly exhausted and since possibilities of decreased costs of wood are directly dependent upon decreased labor costs. Wood is still the most satisfactory packaging material for wholesale shipments of citrus as well as other fruits and vegetables.

If the increasing tendency in Florida to pack without wraps continues, the 7.7 percent of total handling costs for the wrapped box, attributable to this service during the 1940-41 period, will continue to decrease as a percentage of total costs of citrus marketing.

Numerous small economies with a substantial aggregate are possible through more efficient plant lay-out, and there are possibilities of increased efficiency through centralized packing facilities and through integration of packing-house and processing operations.

As freight and refrigeration charges account for from 11 to 18 percent of the consumer's dollar spent for citrus, improved techniques in that service will make an important contribution to the post-war competitive position of citrus.

In anticipation of competition from air lines, refrigerated steamships, and increased fleets of thermostatically controlled refrigerated trucks, the railroads are adopting various improvements and are considering others. Some of these are: The overhead bunker car, carrying greater loads and which may eventually make possible a 20-percent reduction in freight rate per 100 pounds; the standardized 40-foot car, facilitating better loading practices; half-stage icing grates by use of which gross weight of fruit and ice may be reduced 12 percent and a similar reduction made in tariffs; faster, Diesel-powered, short trains that may reduce running time by as much as one third; and refrigerator cars built with lightweight streamlined design, equipped with circulation fans, collapsible bunkers, distant reading thermometers, high-speed trucks equipped with more efficient shock absorbers, and heavier insulation in addition to half-stage icing grates.

Meanwhile, before the war boats were returning to a position of importance in the transportation of citrus, particularly in carrying Florida citrus to North Atlantic ports. Boat rates were reduced during the decade before the war, schedules were speeded up somewhat, refrigeration service was improved, and further precooling facilities at shipside were installed. Possibilities have been considered of installing a fleet of fast fruit boats which will offer competitive schedules to overland freight carriers.

Trucks were offering powerful competition to the railroads before the war, moving 17 percent of all interstate shipments of citrus from Florida during the 1944-45 season in addition to local shipments and movements to boatside and processing plants. During the same season 38.8 percent of all Texas shipments were moved by truck in

addition to movements to processing plants and boatside. Trucks offer several powerful competitive advantages to both boat and rail, such as shorter hauling time, lack of necessity for icing in transit, and flexibility of construction and operation.

The varied motor-vehicle laws among States tend to limit the truck transportation in interstate citrus trade. They impose a practical difficulty upon the distributive system and bring increased costs of transportation.

Little fresh citrus may be moved by air cargo in the immediate postwar period, owing to relative costs of this type of transportation for heavy bulky products and owing to the fact that citrus can stand a longer transit period without serious deterioration.

The comparative advantage of one type of transportation is never a fixed factor. A sound policy would appear to be for State and other regulatory agencies to encourage rapid development of boat, rail, and trucking facilities, and for growers and shippers to remain alert to the relative advantages. It is apparent that producers and consumers will benefit where there is healthy competition between all alternative carriers.

In addition to the above cost reductions, modernization of terminal marketing facilities would decrease rental, depreciation, handling, cartage, spoilage, and waste; direct selling and pool-car purchases would reduce brokerage and commissions; and the practice of consumer packaging would reduce waste and spoilage. The amount of operating profit necessary would be reduced by minimizing uncertainties of the market, which may be accomplished through marketng agreements and similar devices.

Processing

The citrus processing industry has made considerable progress during the last two decades. The number and size of the plants have increased considerably and some of them are now a large-scale operation. The methods of processing and other operations have undergone considerable changes and at present are standardized to the extent that they are relatively uniform in most modern plants. Many hand operations, particularly in handling, slicing, and reaming the fruit, have been replaced by automatic machinery. The utilization of waste through making byproducts brought about the integration of this industry, though not every plant will put out a complete line of citrus products and byproducts.

The customary products of the processing industry are jucies, preserved by flash pasteurization, freezing, concentration, and drying; and segments frozen or canned. The per capita consumption of canned juices during the war increased considerably because of the rationing program and because of improved quality.

In general, rationing restrictions were less rigid on canned citrus juices than on other fruits and fruit and vegetable juices, such as pineapple and tomato. It is difficult to isolate the amount of increased per capita consumption which may have been due to consumer purchases as substitutes for other products.

Improvements in flash pasteurization and in extractors, which resulted in less peel oil in the juices, combined to increase the palatability of the 1944 pack of orange juice. The part of the increased national per capita consumption which is owing to technological improvements will doubtless continue for the next few years.

War needs have curtailed the production of frozen juices, but packers and marketing men predict a good postwar prospect for the product. Production in 1940 was 3.4 million pounds, but decreased to 700,000 pounds in the 1941 season, a quantity which, though small, compared with total juice processed indicates that freezing has advanced to a commercial scale. The juice is extracted in the same way as for canning, is deaerated, and may or may not be pasteurized before it is frozen. The tube freezer adopted for freezing juices in tin cans has found considerable favor.

Concentration by evaporation under vacuum is extensively used in the commercial production of fruit-juice concentrates. Other methods of producing concentrates include concentration by freezing and centrifuging; concentration by high vacuum, low temperature, followed by freezing; and concentration by dehydration, accomplished by spray drying, drum drying, or sublimation from the frozen product under vacuum.

During the war the bulk of the concentrates were prepared by vacuum concentration, the most feasible method, and were shipped abroad under lend-lease arrangements as a source of vitamin C. These concentrates were usually 65 degrees Brix. Several types of concentrates are made for peacetime uses, including the regular concentrate of 6.75-1, a bottlers' beverage base at 4.5 to 1, and dairy bases at 2.5 to 1. These products are used in making carbonated beverages, are served as reconstituted juices by institutions, and are used to a limited extent in confectionery and bakery products. Little if any concentrate has yet been sold at retail.

The process of vacuum concentration to 65 degrees Brix for lend-lease contracts during the period 1943-44 cost about 60 cents gross per gallon in Florida and 73 cents gross per gallon in California, exclusive of raw material costs. Raw material costs averaged about $2.89 and $3.68 in Florida and California, respectively. Raw material and conversion costs combined, minus byproducts credit averaged about $3.43 and $4.08 for Florida and California, respectively.

The ultimate use of juice powder is in reconstituted form, combined with water. Consequently, the market would be for manufacture of beverage bases and for confectionery and baking purposes. The dry powder would compete to a certain extent with fresh juices, canned juices, fresh fruits, and other fruit powders, and would have the advantage of being a uniform stable product. The reduction in volume and saving in space and shipping costs also are noteworthy factors. Typical estimates of total costs of production, including raw material, for orange-juice crystals by sublimation drying, as of 1945, indicated a cost of $1.07 per pound of finished product.

Production of canned grapefruit segments decreased from 4,229,000 cases in the 1938 season to 897,000 in the 1942 season, this marked decrease being chiefly owing to the shortage of tin, the considerable hand labor involved, and the general labor shortage. 29.6 percent of the 1942 grapefruit pack, 0.1 percent of the orange, and 5.6 percent of the grapefruit and orange blend was canned in form of sections. Before the war, canned segments enjoyed a good market both in this country and for export. It can be expected that the postwar market will require even more than the prewar market. The cost of producing natural grapefruit segments in Florida for a dozen No. 2 cans was about 86 cents in 1942; for sweet orange juice segments about $1.29; and for the or-

ange and grapefruit sweet salad, about $1.08.

Approximately 750,000 pounds of frozen grapefruit segments was prepared in Florida during 1943 to 1944. Previous production was not of commercial importance and during the 1944-45 season the packing of frozen segments was prohibited as a conservation measure. The chief advantage of frozen segments is that since the fruit is not cooked the flavor and freshness more nearly resemble fresh fruit, but this must be balanced against the higher cost of production and storage. With larger production units and advances in freezing equipment, the cost of preparing and handling frozen citrus should decrease and a much larger market should develop.

Many byproducts have been developed from the citrus-processing industry. These include cattle feed from pulp, citrus molasses, alcohol, essential oils, seed oil, ascorbic acid, citric acid, yeast, enzyme, pectin, marmalades, and jelly, bland syrup, candied peel, and brined peel. So far, byproducts have been helpful to the processors only in reducing costs on the major profit items, such as single-strength juices. Probably no one of the byproducts could be made into a major profit item, though possibly all byproducts combined might realize a sales value equivalent to or exceeding the conversion costs of the major profit item. In those highly efficient plants where this could be achieved, single-strength juices, concentrates, segments, and similar products can be sold at a price strongly competitive with all forms of processed fruits and fruit and vegetable juices.

Some marketing specialists believe that cattle feed containing molasses and citrus pection are possibly the most promising byproducts now being commercially produced. Before the war, cattle feed from citrus pulp was being produced at around $16 a ton and sold for around $22 a ton, as a carbohydrate livestock feed, which at the same time contained substantial quantities of fat and mineral. Costs of producing molases averaged around $14 per ton and the sales price ranged around $20. Wartime sales prices of these two products were $37.50 and $34.00 per ton, respectively; costs are not available for comparison. In 1943-44 about 102,000 tons of feed were marketed from waste peel. The dry-pulp feeds are

(Continued on page 18)

"It Takes Good Fertilizer To Grow Good Fruit!"

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Fer quite a spell we've been hearin' about Texas' Rio Grande citrus section but it was only this month that we had a chance to see fer ourselves what it was like and to talk to a lot of Texas guys who raise citrus.

We started up the valley from a place called Raymondville and saw a grove here and there set out on very heavy soil, with vegetable crops growin' all around. Being from good old Florida we wondered what kind of quality anyone could git out of a grove on that sort of soil. But we kept on goin' and saw that all their groves was on heavy soil, and afore long we found that while most sizes was very small the quality was good.

We drove and visited all over the citrus section and was impressed by the big acreage of new plantings . . . most of these groves was in 10 to 20 acre tracts, but they sure was plenty of 'em, and they'll shore swell the crop total when they come into bearin' 3 or 4 years from now. They wasn't no big plantin's like we have at Groveland and other parts of our state.

We didn't know nobody and we shore had a time findin' anybody that could or would give us a room, and after a time sleepin' on a cot in hotel hallways got sort of regular . . . however, we didn't blame Texas cause we've heard folks say the same thing about Florida . . . and they was a lot of times that folks was kinder to us than we mighta been at home.

One man, L. F. Martin, of Martin Citrus Groves at Donna, shore was swell to us . . . he had a smile as big as the state of Texas, and he give us all the answers to the stream of questions we shot at him. He shore made us feel that citrus growin' in Texas was a purty nice business . . . incidentally he was sort of a friend to start with cause he said he kept up with Florida citrus growin' through readin' the Lyonizer in the Citrus Industry every month . . . he wasn't the only one who was nice to us either and we want right here to thank them all—a heap.

A lot of us Florida growers figgered that Texas was only producin' grapefruit and that's about true right now, cause 75 percent of their groves is grapefruit, but we'll be hearin' about Texas oranges too, before long . . . they's a lot of Hamlin's, Pineapples,

Temples and Valencias that will be producin' mighty soon . . . Texas plans to start its Valencias to market about the 15th of February . . . some of their Valencias are being consumed locally now.

Fertilizin' in Texas is altoghter different from Florida's program . . . their poundage is very light and most groves is fertilized only once a year, tho in some cases they give 2 applications . . . in the spring they use sulphate of ammonia 'cause their soil is so alkaline, or if they can't git that they use ammonium nitrate . . . in late summer they use a 4-12-4 and some times make direct applications of superphosphate . . . they aren't using much secondaries yet, and could improve their crops by usin' some zinc and manganese 'cording to our way of thinkin'.

They ain't hardly no spraying bein' done in Texas, most of their pest control bein' done by dustin'. Their scale troubles is mostly controlled by the scale's natural enemies and by their dustin'. They don't have any scab and melanose is only jist beginnin' to show up.

They seems to be a heap more labor available in Texas than at home and the rate of pay is from two to three dollars a day, and while this seemed mighty low we finally concluded that the "cheap" labor was mighty expensive when judged by the production. We visited several groves where this kind of labor was "working" and even as tough as labor is to get in Florida we'd a kicked the kind we saw out of our grove if they'd been doin' the same kinda work.

Fruit prices in Texas was about the same as in Florida . . . and we heard the same stories out there as we hear at home, about sendin' green fruit to market and sich . . . Texas growers sell on a tonnage basis and the price on grapefruit was $7 to $8 a ton and on oranges was from $14 to $15 per ton.

We went to the Mission Citrus Fiesta at Mission, Texas, and saw Queen Cioriana X rule over the area which up to 1870 was ruled by King Cactus . . . the theme of the show was "From Cactus to Citrus" . . . the show was a lot like our Citrus Exposition at Winter Haven, but our show is a heap better than the one we saw in the Lone Star State . . . fact is we doubt if they's any such kind of show in the country that can touch the citrus show we have at Winter Haven.

Addin' it all up . . . Florida is my home state and I got some citrus property here, and I think Florida is the most wonderful state in all the Union . . . but folks I want to tell you that Texas folks think they've got a grand state—and they have . . . Florida's got to keep on her toes if she wants to continue to rank as the leadin' citrus producin' state 'cause Texas is shore plannin' to give us a run for the money.

Uncle Bill

READJUSTMENTS IN PROCESSING AND MARKETING CITRUS FRUITS

(Continued from page 15)

strongly competitive with beet pulp and the molasses feed is competitive with the regular grain sweet feeds. If necessary for competitive pricing with other feeds, the expense of waste disposal for accounting purposes in the plant could be charged to the major product and credited to cattle feed. About 4 million pounds of the 6 million pounds of 100-grade pectin produced in 1944 was citrus pectin. About 40 to 50 percent of this quantity was used by lend-lease and the armed forces. The price of 100-grade pectin before the war was as low as 60 cents a pound. Some manufacturers of citrus pectin think that in the postwar period 100-grade pectin can be made to sell at from 35 to 50 cents per pound. If so, this byproduct will be strongly competitive to apple pectin and may reach a substantial export market in addition to the domestic market.

The postwar period is finding a greatly expanded citrus industry with surplus fruit and fruit products. Growers will find it necessary, however, to continue the present trend of putting a larger proportion of fruit into processing each year. It will therefore be necessary to find new products and byproducts to expand the use of citrus. One such product would be a jellied citrus juice obtained with low methoxyl pectins. It would seem that such a product would be readily accepted by housewives who may merely open a can and remove the jellied juice for salads. Another product, upon which considerable work has been done and which is covered by a patent, is a hard tablet of citrus juice. At one time small amounts of grapefruit seed oil were produced in Florida. The producing plant closed but it is generally thought that production of oil from seeds may be feasible.

Traditionally the greatest total returns to citrus growers have been received from fresh marketing. Some have feared that processed forms of citrus would disturb the fresh market, and have therefore been inclined to regard processing as an outlet to be resorted to only in emergency. Although the processed forms suggest markets often unreached by the fresh fruit, there is some replacement of fresh with processed whenever both are marketed. But this study suggests that competition should not retard all possible efforts to develop the processing outlet. The situation is not simply one of competition between fresh and processed citrus; in addition, fresh citrus faces competition of other fruits as well as the impact of current technological developments. Even though fresh citrus may hold its own with other fresh fruits and with canned citrus as now developed, this may not continue indefinitely in the face of technological developments which give the housewife a better product in more convienient form. The per capita consumption of fresh citrus may be approaching a peak, and if the rapidly increasing production is to be marketed, other outlets must be reached.

Examination of prices returned from processing outlets, compared with fresh since 1938, show that grower returns per box often approach the returns from fresh market, particularly when the difference in grades customarily so marketed is taken into account.

The most favorable price for oranges for processing compared with the price for the fresh market is found in the case of the Florida early and midseason varieties and Valencias. This price was not entirely due to the war conditions, since this comparison was almost as favorable in 1938 as in 1943 for those preferred varieties. In general, however, the price for processing compared with the price for the fresh market has improved very much since 1940. The most unfavorable comparison exists in the case of navel and miscellaneous varieties produced in California. Prices of oranges in that category for processing are low because only recently has the navel orange been considered acceptable for processing even now is not preferred. Because seeded varieties of Florida grapefruit are preferred for juice, those varieties show a stronger price for processing; that price even exceeded the price for the fresh market during the 1943 season. The processing price appears to have been less favorable in Texas and California than in Florida, though it was considered to be good, on the average.

The price paid for lemons for processing provides a much lower relative return than the price for either oranges or grapefruit. As a joint outlet for the total lemon supply, however, processing provides a means of utilizing the entire crop with higher total returns to the growers than if the total supply were sold or if part were destroyed.

Obviously several abnormal wartime factors influenced the favorable prices for processing since 1941, but some price analysts believe that processors can continue to pay competitive prices during the next few years. Certain economies may help to make this possible, including savings in picking costs; utilization of byproducts; transportation savings, as no refrigeration is required; reduction in spoilage and shrinkage, and savings in costs of retail distribution.

Examination of production and utilization figures for grapefruit indicates that much of the increased production has gone into processing. Whereas during the period from 1928-29 through 1940-41 the total available supply of grapefruit increased from about 13-½ million to about 43 million boxes (an increase of 218 percent) the quantity sold to the fresh market has about doubled.

As the total of oranges has increased during the above period, the total quantity marketed fresh has similarly increased. This contrasts with the tendency observed with grapefruit. The full impact of possible competition between the canned orange juices and fresh oranges has not yet been felt. As the volume of oranges that are processed increases and as the quality of processed orange juices is improved, the effect on the volume of oranges shipped fresh will become more pronounced. But this competition for the sake of the industry as a whole, should not hinder active efforts to develop acceptable canned and frozen juices and to promote their marketing. If the products are made to be thoroughly comparable with the fresh in quality, the volume of processed juices, segments, and other processed items may outstrip present sales of the fresh fruit.

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To say that good crops are dependent upon quality ingredients starting with the seed and including the fertilizers and insecticides, to say nothing of intelligent and intensive crop care.

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Don't Miss The Florida State Fair
The Florida Citrus Exposition

JACKSON GRAIN COMPANY

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For 38 Years

Tampa 1 Florida

The Growers' Own Page

This department is devoted to the growers, for their use in giving expression to their views and a discussion of growers' problems. Any grower is welcome to make use of this department for the discussion of topics of interest. The only requirements are that the articles must be on some subject of general interest, must be reasonably short and must be free from personalities. The editor assumes no responsibility for views expressed, nor does publication imply endorsement of the conclusions presented.

ABOUT "COLOR ADDED" ORANGES

Tampa, Florida,
January 7, 1947

Mr. S. L. Frisbie,
Editor, Citrus Industry,
Bartow, Florida File A-1

Dear Mr. Frisbie:

I will appreciate the courtesy if you will send me half dozen extra copies of last (January) edition of "Citrus Industry." Bill me here.

Incidentally, someone should correct the statement of U.S.D.A. Report (second complete paragraph, third column, p. 7) appearing in your January issue that:

"Maturity standards are still on the same bases, in all States."

Florida's basic law (not her "color added" law) is far higher than California, and her enforcement thereof makes California's alleged inspection a joke. (The article does admit, at p. 22, that our "color added" laws are "more stringent".)

California oranges move from Central California on no other maturity requirement than a 7-to-1 ratio of solids to acid. Since the Federal test for oranges shipped interestate is 8 to 1, the shipment of these 7-to-1 Califilornia oranges is brazenly illegal.

California's inspection service is staffed by inspectors appointed by County Agricultural Commissions from a list recommended by packinghouse operators. The inspectors do other work in packinghouses and are paid by them.

How many immature oranges are condemned by California inspectors? Don't make me laugh!

They don't have to worry about consumer reaction against their immature fruit. Thanks to our chuckleheaded newspaper editors, and self-styled doctors for citrus industry ills, both of whom rant about the necessity for shipping only "tree ripened" fruit and the evils of "ripening in the packinghouse", with other and similar absurdities, spouted along with connected praise of California's practices, the consumer is well educated, by Florida, to believe that any sorry orange is from Florida, and that everything in and from California is pure and holy.

It would seem that there should be some way to put a gag on these devotees of ignorance parading in print, who do not know enough about citrus to know that there is no way of further ripening any citrus fruit after it is picked.

Our Express Shippers who play so hard this "tree ripened" theme, in their advertisements, are doing an incalculable amount of harm, by causing consumers to believe that Florida uses artificial "ripening" processes that are deleterious to flavor and keeping quality.

The term "tree colored", while more honest, also leads the consumer astray. The Valencia is beautifully colored in January, but it isn't ripe until March. In normal bloom years, early varieties are mature, and as good to eat as they will ever be, by November 1st, when the peel is still green. By the time such early fruit is "tree colored" it is over ripe, insipid and beginning to dry up.

In December "House Beautiful" alone, there are four Florida, three Texas advertisements, by express shippers. Of these, all of the Florida, one of the Texas, play the "tree ripened" tune.

I long ago got used to having friends in the North, who have swallowed this Florida propaganda against Florida citrus, show me sorry oranges from other States, (not "color added") in attempts to prove to me that those who "low-rate" our fruit are correct.

But I had the ultimate illustration today. A Tampan, who has been reading our Tampa Tribune, but who knows the "why" of "color added" came charging into my office, to tell me we simply must do something to stop the abuse of "color-added". He had seen some "color-added" fruit in New Orleans last week that were simply terrible —the color was plumb red, not orange, and it was "smeared on". Questioning developed that he had been looking at Texas "Ruby Red" grapefruit.

His face was red, also, when I gently explained what he had seen and that grapefruit is not "color-added". He knew the value of "color added" to Florida, but he had, unconsciously, absorbed our propaganda against our own, that if he saw citrus that didn't look right, it was bound to be from Florida.

As ever, with cordial personal regards, I am,

Very truly,
Frank R. Schell

QUALITY IN CITRUS FRUITS

(Continued from page 9)

changes in Florida. U.S.D.A. Tech. Bull. 753.

(5) ————and Wadley, F. M. 1945. Study of quality in Temple oranges. Food Res., Vol. 6, pp. 510-517.

SHOULD I BUY A CITRUS GROVE?

(Continued from page 10)

for self and family. With a reasonable purchase price, it is better to have a small equity in a good grove of ample acreage—20 acres or more—than to have a larger equity in fewer acres.

Better CROPS • More! PROFITS
FROM
GROVE IRRIGATION SYSTEMS
INCREASED PRODUCTION Per Acre
PIPE-PUMPS-ENGINES
Water Well & Irrigation Supplies
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ENGINEERING SERVICE
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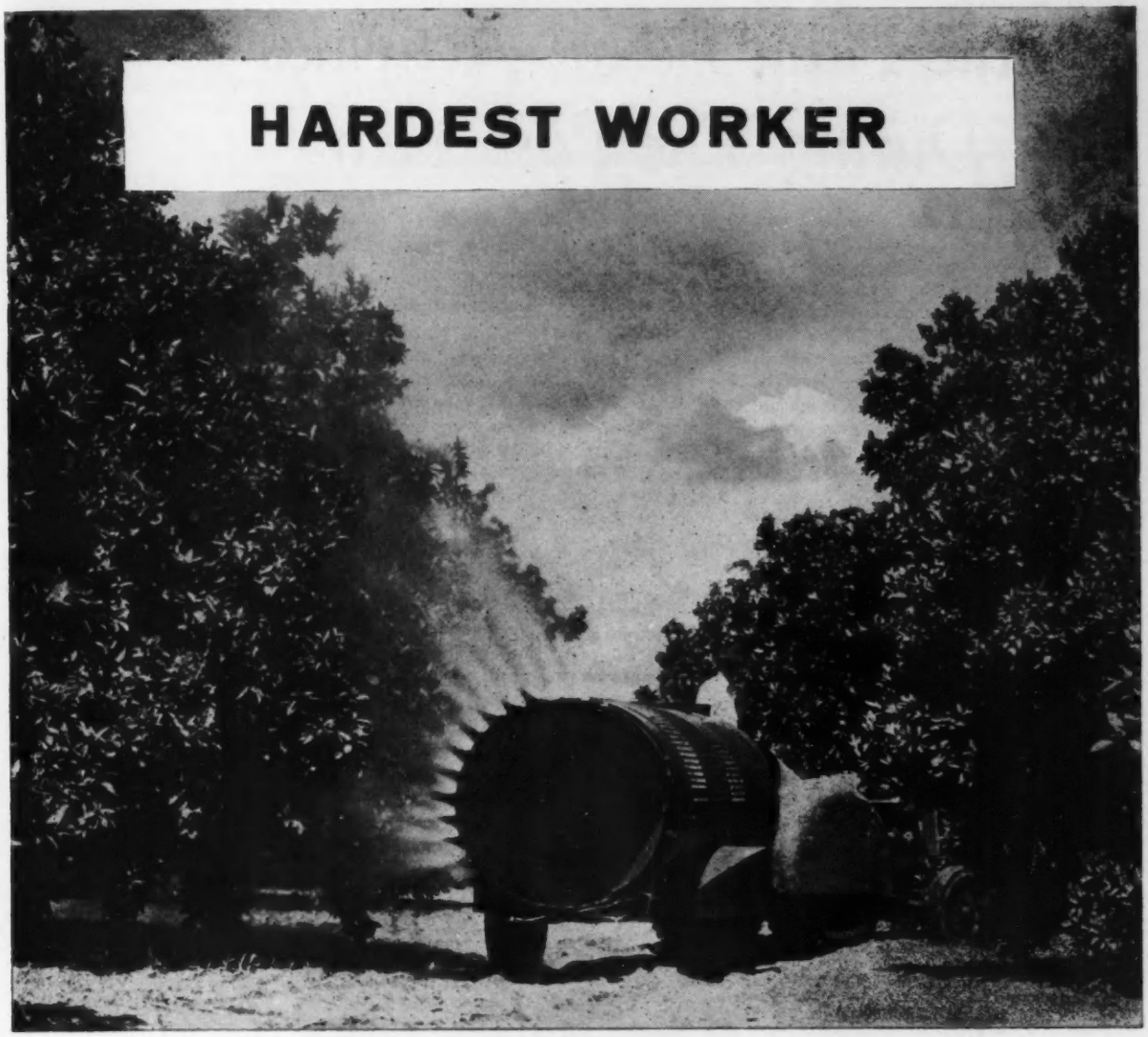
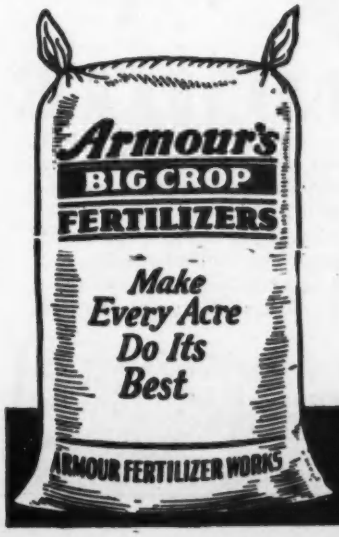


IN THE GROVE



This time of the year, citrus trees need help—in the form of nourishing, hard-working plant foods—to carry that new crop on through the dry season to a successful harvest. Armour's Big Crop Fertilizers are famous all over Florida for their ability to stay with the trees throughout this critical growing season, providing easily-available plant nutrients in scientifically-controlled quantities.

So don't delay. Order and apply Armour's in your groves now. Send a card to our office in Jacksonville if you want advice from a trained Armour Field Representative. No obligation, of course.

ARMOUR FERTILIZER WORKS
JACKSONVILLE, FLORIDA

State Plant Board Activities During The Past Year

ARTHUR C. BROWN
Plant Commissioner, State Plant Board

The activities of the State Plant Board during the last eleven and a half months were essentially the same as in preceding years. We are happy to report that nothing new or startling transpired during this period. However, the Plant Board organization and the fire departments of large cities have much in common: it is never known when a major alarm is likely to be received. Like members of the fire departments, the Board's inspectors must be on call at all times. When a call is received from a grower who has discovered some unusual condition affecting his plants, inspectors sent to investigate never know in advance whether the call will be a false alarm, or whether some new pest has started a major conflagration in our fields or groves.

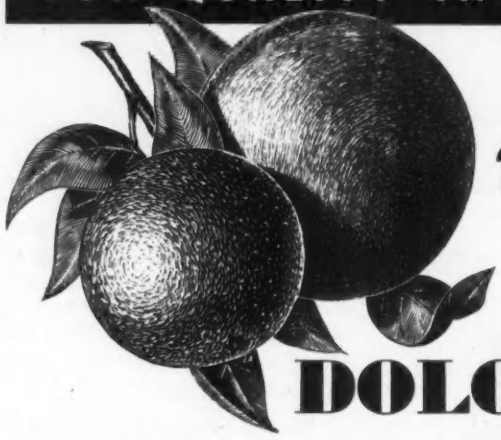
Everyone familiar with the extent of the air traffic into Florida from foreign countries realizes that a real and serious call for help may be received from growers at any time. Between twenty-two and twenty-three thousand planes arrived during the year from over eighty foreign countries. According to information furnished by representatives of the international air transportation companies, it is expected that the average daily arrivals of aircraft will be increased from the fifty-two now on schedule to eighty-six within the next few months. In addition to arrivals by air, 5205 watercraft form foreign ports were boarded. Contraband plant material that originated in eighty-five foreign countries was confiscated by Plant Board inspectors. Plants or plant products affected with insects or diseases from fifty-five foreign countries were confiscated.

The expansion in foreign air traffic has caused a serious drain on the manpower and personnel available to the Board. Air traffic, by reason of the fact that planes may, and do, arrive at any hour during the day or night, makes necessary a two—and even threefold increase in the number of inspectors assigned to our ports of entry. The situation is further complicated by the tremendous increase in the costs of subsistence and housing. Inspectors are located, among other places, at Miami, Fort Lauderdale, and West Palm Beach. Those who are fortunate enough to own their own homes are able to get by on the salaries received. But it is almost impossible for men newly assigned to these ports to find places to live. Plant Board inspectors are not able to pay the rentals asked for apartments in these cities. Some of the Board's employees have been forced to purchase trailers in order to find places to sleep.

Some idea of the menace presented by plants and plant products brought into Florida by airplanes may be formed when it is stated that during the past year Plant Board inspectors intercepted fruits infested with fruit flies on 209 different occasions. It should be stated that the infested materials were carried as hand parcels by passengers, or were found in ship's stores. No commercial shipments were found infested. State and federal quarantines regulate the entry of commercial lots of fruits and other hosts of fruit flies. In addition to fruit flies, many other commodities infested or infected with plant pests were confiscated.

The Board's nursery inspectors continued their regular and frequent inspection of commercial nurseries throughout the state. You will be interested to learn that there are some 1,900 nurseries in Florida with an acreage of approxi-

FOR QUALITY INSURANCE



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CORRECT acid-alkali balance in your soil and supply plenty of essential calcium and magnesium through annual applications of d/p DOLOMITE, and you'll find that you've taken a long step toward quality insurance. This *double value* of d/p DOLOMITE makes good fertilizers give better results . . . and unlocks acid-frozen plant food already in your soil. One application a year gives exceptional results. Plan now to apply d/p DOLOMITE!

DOLOMITE Products, Inc. OCALA, FLORIDA

MODERN PASTURE IMPROVEMENT METHODS PAY BIG DIVIDENDS

mately 1,500. Some 51,000,000 plants were growing on these properties. Of this total over twelve million were citrus trees, and the remainder, approximately thirty-eight million, were non-citrus. In addition inspections were made of large acreages of ferns, gladiolas, Easter lilies, caladiums, and vegetable plants. No new insect pests or diseases were noted by the Board's inspectors.

Nothing new or startling was discovered by the grove inspectors during the year. However, the members of the Plant Board and the Plant Commissioner and his associates are not satisfied with the progress of the Grove Inspection Department. During the war there was a great increase in the number of arrivals of commercial and service airplanes. The Board's quarantine inspectors were able to handle such planes as arrived at the regular ports of entry. But it is known that at times some service planes arrived at fields in Florida at which neither Plant Board nor Customs inspectors were stationed. On account of the submarine menace during the early days of the war, many watercraft were forced to put in at Florida ports with cargoes that in the past were prohibited entry at southern ports on account of the pest risks involved. Every precaution was taken to safeguard these arrivals, but it is always possible that some insect or disease slipped into the country. During the same time the Board's grove inspection force was greatly reduced through loss of personnel to the armed services and essential war activities, and it was not possible to secure qualified replacements at the salaries offered. Thus at a time when the grove inspection force should have been operating at full efficiency, it was actually lagging behind in its schedule. It was deemed best to confine grove inspection activities to areas in which ports of entry for both service and commercial planes were located, on the theory that any newly introduced plant pest would make its first appearance in the areas into which it was introduced. The Plant Commissioner believes that it will be several years before any real information as to the presence of newly introduced foreign plant pests is established.

One of the interesting develop-

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Your patience during the trying period of the War is appreciated.

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has been helping growers produce clean fruit of high quality with its minor element program.

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NACO FERTILIZER COMPANY JACKSONVILLE 1 .... FLORIDA

ments during the year was the approval by the State Plant Board of the use of sulfathiazole for the control of the destructive bacterial disease of bees commonly known as American foulbrood. Until recently, the only known and approved method of eradication of this disease, which, if left to run its course in an apiary unchecked, is capable of causing losses up to 100 percent of the apiary, was the destruction of bees, frames, and brood by fire, the searing of the insides of the hive bodies, and careful disposal of the honey removed from the infected colonies. This meant that in the cases of severely infected apiaries, the owners were likely to lose all of their bees and be forced out of business. For the past several years investigators have been experimenting with sulfa drugs for the control of this disease. Bees in infected colonies were fed a mixture of sugar and water containing the drug. The Board's Apiary Inspector carried on experiments here in Gainesville. The results obtained by these trained individuals were most satisfactory, even astounding. Through careful handling, the disease in even the most severely affected colonies apparently can be reduced to the point where it cannot be noted by visual inspection, and colonies of bees that were doomed to destruction either through the ravages of the disease or burning by owners or inspectors, should be restored to normal brood and honey producing conditions within a comparatively short time.

Other activities of the Plant Board included the inspection for and control of sweet potato weevil and white-fringed beetle. The first mentioned pest has been present in the peninsular portion of the state for at least three quarters of a century. In addition to sweet potatoes, it infests wild morningglory plants growing along the coast lines and in the hammocks. This fact makes eradication in the peninsular portion of Florida impractical. The efforts of the Board's inspectors are confined to inspections in the western part of the state, where the weevil is found at times, and to assisting farmers to eradicate it. This is a comparatively simple and inexpensive task, which is accomplished through the planting of clean seed or plants and the destruction of all old infested plants and debris.

White fringed beetle is confined, to the best of our knowledge, to portions of Okaloosa, Escambia, and Walton Counties. It is a serious pest of peanuts, velvet beans and other field crops, and at times may cause injury to vegetable crops. In addition to Florida, the pest is present in Louisiana, Mississippi, Alabama, Georgia, and North Carolina. Although first reported from the vicinity of Florala, Alabama, on the Florida-Alabama line, in 1936, careful and repeated inspections in Georgia failed to disclose the presence of white-fringed beetle until April 1946. Inspections made by state and federal authorities promptly disclosed the fact that the insect was present in 43 counties in Georgia. There is evidence that leads authorities to believe that it has been in some localities in that state for at least ten years. This supports the belief of some authorities that white-fringed beetle is present throughout the South, and is likely to become a pest of serious economic importance in certain areas and under certain conditions. However, it is known to cause injury to Irish potatoes in Alabama, and precautions should be taken to prevent its introduction into the potato growing areas around Hastings and La Crosse. We have no information as to its potential menace to celery, but, again, we do not want to have it introduced into our celery producing areas. Authorities who have studied white-fringed beetle in South America believe that the known infested areas in Florida are located on the southern border of its possible range in the United States. If this is true, it is not likely to become a serious pest in our vegetable plantings.

This concludes the brief summary of the activities of the State Plant Board for the calendar year 1946.

SEE Our Irrigation Exhibit

At Florida Fair In Tampa February 4th Thru 15th
In Commercial Building

Also At

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• That's what every Citrus Grower wants . . . and that's what the Swift's Growers Advisory Service can help you get. You see, Swift & Company have long been associated with the citrus growers of America. We've studied the plant food needs of citrus trees from every angle. We recognize that, as manufacturers, it is up to us to give the directions and suggestions on how each customer of ours should use our products to get the greatest benefits from his plant food investment.

Our experts go right out into your groves and base their recommendations on what they find there . . . the condition of your trees . . . the foliage . . . twig growth and the analysis of your soil. Their recommendations are not limited to feeding. Their training and experience covers spraying and grove cultivation.

LET US SEND YOU FULL INFORMATION!
ADDRESS:

SWIFT & COMPANY
PLANT FOOD DIVISION

Bartow, Florida

A Great State Fair; Great Citrus Exposition

Florida citrus growers are deeply interested in two great expositions scheduled for the coming month—the Florida State Fair at Tampa, February 4 to 15 inclusive, and the Florida Citrus Exposition at Winter Haven, February 17 to 22 inclusive.

While covering every phase of Florida's agriculture, live stock, horticulture and varied industries, the Florida State Fair features citrus above all else and attracts exhibits from every citrus producing area. It permits Florida citrus growers to observe first hand what the growers of other sections are doing and to compare results, while to the thousands of Florida visitors who visit the Fair, it is an object lesson in the state's great citrus industry.

The Florida Citrus Exposition is primarily and almost wholly a citrus exposition. Held in the very heart of the citrus belt it brings together the products of groves from every section for exhibition and judging. Amusements, of course, will abound and the year's citrus Queen will be chosen and crowned.

Both the Fair at Tampa and the Citrus Exposition at Winter Haven are great affairs. They merit the attendance of every winter visitor and of every citrus grower who can possibly arrange his affairs to visit one or both of these great expositions. The magnitude of Florida's citrus industry will be a surprise to even many citrus growers themselves.

Thirteen 4-H club boys from the group nursery at Umatilla and their local leader recently visited the federal Sub-Tropical Fruit Experiment Station at Orlando with Asst. County Agent J. P. Hill. Station workers showed the group 72 different rootstocks.

CLASSIFIED Advertisements

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion. Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

AVOCADO-MANGO TREES 1947 PLANTING FOR SALE IN QUANTITY. BROOKS-TOWER NURSERIES Box 36, HOMESTEAD, FLORIDA.

MOTORS 3 PHASE, 60 CYCLE, 220 Volt, 1140 RPM, all sizes, ¼ HP to 20HP, inclusive. — Juice Industries, Inc., Dunedin, Fla.

STEEL PIPE, BLACK OR GALVANIZED, all sizes, 1¼" to 10" inclusive. Send list of your requirements. —Juice Industries, Inc., Dunedin, Fla.

WANTED—Several bushels Cleopatra Mandarin seed; harvesting time delivery. Write R. R. Box 202, Route 2, Harlingen, Texas.

CITRUS TREES—Best quality usual varities on sour orange or rough lemon stock. Robt. P. Thornton, c/o Clay Hill Nurseries Co., Box 2880, Tampa, Florida.

GASOLINE STORAGE TANK — 18,000 Gallon capacity horizontal. Juice Industries, Inc., Dunedin, Fla.

FOR SALE — Lyonizer fertilizer spreader, speed sprayer, two supply units mounted on trucks and one model C Case tractor. Write Post office Box 336, Avon Park, Florida.

SUPERIOR CITRUS TREES. LIMITED number available for winter planting. Booking orders principal varieties for June planting. Trees on Rough Lemon, Sour Orange and Cleo root. Ward's Nursery, Avon Park, Fla.

COPOROL

A perfectly balanced and emulsified copper-oil combination for effective

CONTROL

of white fly, scale, scab and melanose.

A COMPLETE

formula. No oil or other chemicals to add. Ready to mix with any type of water.

We manufacture and stock all types of insecticides for citrus and vegetable crops.

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Lakeland, Florida

IRRIGATION EQUIPMENT
FREE ENGINEERED LAYOUTS
ON STEEL OR ALUMINUM
Flex-O-Seal Lock Joint Portable Pipe
Ames Quick Coupled Lock Joint Portable Pipe In Plain Or Perforated
Peerless Turbine Deepwell And Centrifugal Pumps
THE CAMERON & BARKLEY CO.
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